

**Remarks**

Claims 1-20 are pending herein. Claims 1-7 and 14-18 have been withdrawn as being directed to a non-elected invention. By this Amendment, claims 8 and 12 have been amended and new claims 19 and 20 have been added.

Claims 8 and 12 have been amended to recite a full description of the adsorbent referred to therein. Support for the amendment to these claims can be found, e.g., in withdrawn claim 1.

Claims 8 and 12 have also been amended to recite that the inert binder contains at least 80% by weight of clay which has undergone zeolitization by the action of an alkaline solution. Support for this recitation can be found in the specification at, for example, page 4, lines 33-35.

New claims 19 and 20, which depend upon claims 8 and 12, respectively, recite that the clay used in the binder is selected from the group consisting of kaolinite, halloysite, nacrite and dickite. Support for this recitation can be found in the specification at, for example, page 5, lines 17-18.

In the Office Action, claims 8-12 are rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3 and 7-12 of U.S. Patent 6,410,815 to Plee et al. ("Plee"); claims 8-10, 12 and 13 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 3,960,774 to Rosback ("Rosback") in view of U.S. Patent 3,558,732 to Neuzil et al. ("Neuzil"); and claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Rosback and Neuzil further in view of U.S. Patent 4,642,406 to Schmidt ("Schmidt").

In view of the amendments and remarks herein, Applicants respectfully request reconsideration and withdrawal of the rejections set forth in the Office Action.

**I. Double Patenting Rejection**

Claims 8-12 are rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3 and 7-12 of Plee.

Applicants respectfully submit that instant claims 8-12 would not have been obvious over claims 1, 3 and 7-12 of Plee.

Claims 8 and 12, as amended herein, recite that the binder in the agglomerated zeolitic adsorbent contains at least 80% by weight of a zeolitized clay. Claims 1, 3 and 7-12 of Plee do not recite this feature. Furthermore, the claims in Plee relate to "LSX" zeolites (i.e., zeolites with an Si/Al atomic ratio less than 1.15:1, whereas Applicants' claims relate to "X" zeolites (i.e., zeolites with an Si/Al atomic ratio of from 1.15:1 to 1.5:1).

Thus, for at least these reasons, Applicants respectfully submit that instant claims 8-12, as well as new claims 19 and 20, are patentable over Plee.

## **II. Rejection of Claims 8-10, 12 and 13**

Claims 8-10, 12 and 13 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rosback in view of Neuzil.

Rosback is cited, *inter alia*, for disclosing a process for separating a para-xylene from a mixture of C<sub>8</sub> aromatic hydrocarbons by contacting the mixture with an adsorbent comprising zeolite X with a silica/alumina ratio of about 2.5 (Si/Al: 1.25:1). The adsorbed para-xylene is removed from the adsorbent by using a desorbent. The Office Action notes that Rosback does not specifically disclose that the adsorption process occurs in the presence of a desorbent. Neuzil is cited for disclosing an adsorption process for para-xylene, wherein the adsorption step is operated in the presence of a desorbent. According to the Office Action, it would have been obvious to have modified the Rosback process by operating the adsorption process in the presence of a desorbent as taught in Neuzil because of the effectiveness of operating the adsorption process in the presence of a desorbent.

Applicants respectfully submit that claims 8-10, 12, 13, 19 and 20 would not have been obvious over Rosback in view of Neuzil.

As amended herein, claims 8 and 12 recite that the binder in the agglomerated zeolitic adsorbent contains at least 80% by weight of a zeolitized clay. Example 4 of the

instant specification describes a process for recovering para-xylene from C<sub>8</sub> aromatic isomer fractions, wherein the agglomerated zeolitic adsorbent contains a zeolitized clay in accordance with the present invention. Example 3 of the instant specification is identical to Example 4 except that the agglomerated zeolitic adsorbent contains a non-zeolitized clay. As discussed in the specification at page 13, lines 4-8, the use of an agglomerated zeolitic adsorbent containing zeolitized clay makes it possible to obtain the same purity of para-xylene while increasing the flow rate of the feedstock entering the pilot unit up to 5.5 cm<sup>3</sup>/min, which represents an increase of 10%. Thus, the use of a zeolitized clay in the agglomerated zeolitic adsorbent significantly affected the efficiency of the para-xylene-recovery process.

Neither Rosback nor Neuzil teaches the use of zeolitized clay in the adsorbents taught therein. Rosback only teaches that the binder therein is amorphous (see, e.g., col. 7, lines 11-13. Neuzil does not mention any binders. Thus, Applicants submit that Rosback in view of Neuzil would not have rendered instant claims 8-10, 12, 13, 19 and 20 obvious.

### **III. Rejection of Claim 11**

Claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Rosback and Neuzil further in view of Schmidt.

According to the Office Action, neither Rosback nor Neuzil discloses that the process is operated in a simulated cocurrent fasion. Schmidt is cited for disclosing that an adsorption process of para-xylene can be operated in either a simulated countercurrent mode or a simulated cocurrent mode. According to the Examiner, it would have been obvious to have modified the process of Rosback/Neuzil so as to operate the process in a cocurrent mode because a simulated cocurrent mode has an equivalent function as a simulated countercurrent mode.

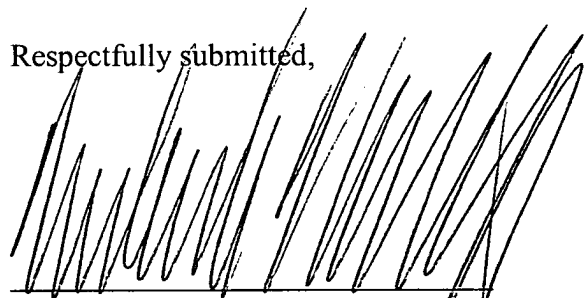
Applicants respectfully submit that claim 11 would not have been obvious over Rosback and Neuzil further in view of Schmidt. Like Rosback and Neuzil, Schmidt does not teach the use of zeolitized clay in the adsorbent taught therein. Thus, Schmidt does not

cure the failure of Rosback and Neuzil to teach the adsorbent used in Applicants' claimed invention.

**IV. Conclusion**

In view of the foregoing amendments and remarks, Applicants respectfully requests that the rejections set forth in the Office Action be withdrawn and that claims 8-13, 19 and 20 be allowed.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Frederick F. Calvetti', written over a horizontal line.

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## LISTING OF CLAIMS

Claims 1-7 (Withdrawn)

Claim 8 (Currently Amended): Process for the recovery of para-xylene from C<sub>8</sub> aromatic isomer fractions in the liquid phase by adsorption of the para-xylene by an agglomerated zeolitic adsorbent according to Claim 1 in the presence of a desorbent, the agglomerated zeolitic adsorbent comprising zeolite X and an inert binder, the inert binder containing at least 80% by weight of clay which has undergone zeolitization by the action of an alkaline solution, the zeolite X having an Si/Al ratio such that  $1.15 < \text{Si/Al} \leq 1.5$  and having exchangeable cationic sites, wherein at least 90% of the exchangeable cationic sites of the zeolite X are occupied either by barium ions alone or by barium ions and potassium ions, the exchangeable sites occupied by potassium ions optionally representing up to 1/3 of the exchangeable sites occupied by barium ions and potassium ions, wherein the adsorbent has a Dubinin volume of greater than or equal to 0.240 cm<sup>3</sup>/g, the Dubinin volume being measured by nitrogen adsorption at 77°K after degassing under vacuum at 300°C for 16 hours.

Claim 9 (Original): Process for the recovery of para-xylene according to Claim 8 of simulated moving bed type.

Claim 10 (Original): Process for the recovery of para-xylene according to Claim 9 of simulated countercurrent type.

Claim 11 (Original): Process for the recovery of para-xylene according to Claim 9 of simulated cocurrent type.

Claim 12 (Currently Amended): Process for the recovery of para-xylene from C<sub>8</sub> aromatic isomer fractions in the gas phase by adsorption of the para-xylene by an agglomerated zeolitic adsorbent according to Claim 1 in the presence of a desorbent, the agglomerated zeolitic adsorbent comprising zeolite X and an inert binder, the inert binder containing at least 80% by weight of clay which has undergone zeolitization by the action of an alkaline solution, the zeolite X having an Si/Al ratio such that  $1.15 < \text{Si/Al} \leq 1.5$  and having exchangeable cationic sites, wherein at least 90% of the exchangeable cationic sites of the zeolite X are occupied either by barium ions alone or by barium ions and potassium ions, the exchangeable sites occupied by potassium ions optionally representing up to 1/3 of the exchangeable sites occupied by barium ions and potassium ions, wherein the adsorbent has a Dubinin volume of greater than or equal to 0.240 cm<sup>3</sup>/g, the Dubinin volume being measured by nitrogen adsorption at 77°K after degassing under vacuum at 300°C for 16 hours.

Claim 13 (Currently Amended): Process for the recovery of para-xylene according to Claim 8, wherein process the desorbent is toluene or para-diethylbenzene.

Claims 14-18 (Withdrawn)

Claim 19 (New): Process for the recovery of para-xylene according to Claim 8, wherein, in the binder present in the agglomerated zeolitic adsorbent used in said adsorption step, the clay is selected from the group consisting of kaolinite, halloysite, nacrite and dickite.

Claim 20 (New): Process for the recovery of para-xylene according to Claim 12, wherein, in the binder present in the agglomerated zeolitic adsorbent used in said adsorption step, the clay is selected from the group consisting of kaolinite, halloysite, nacrite and dickite.